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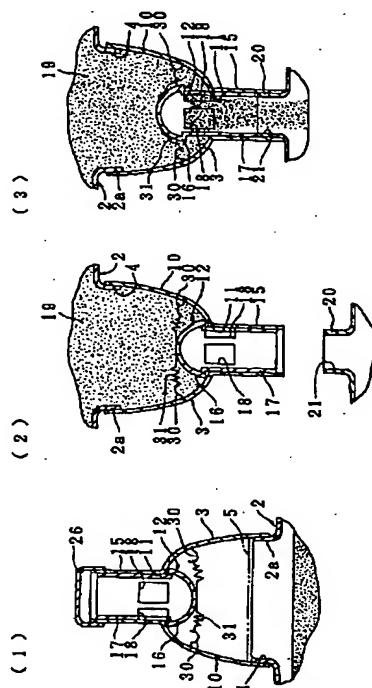
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(54) 【発明の名称】 トナー補給用治具およびトナーカートリッジ

(57) 【要約】

【構成】 トナー容器2に着脱可能なカバー10に形成されたトナー出口11を開閉する弁部材12を備える。その弁部材12をトナー出口11の開き位置に押し上げる押し上げ部20が現像装置に設けられる。

【効果】 現像装置にトナーを確実に投入でき、現像装置の補給口の構造を簡単化でき、トナーの漏れを無くすことができ、再利用でき経済的であって組み立てが容易なものである。



## 【特許請求の範囲】

【請求項1】 現像装置にトナーを補給するためのトナー補給用治具であって、トナー容器に着脱可能なカバーと、このカバーに形成されたトナー出口を開閉する弁部材とを備え、その弁部材をトナー出口の開き位置に押し上げる押し上げ部が前記現像装置に設けらることを特徴とするトナー補給用治具。

【請求項2】 前記トナー出口の周囲部からカバー外部に向かい延出する筒状の案内部が設けられ、前記弁部材はこの案内部に挿入される筒状のシート部を有し、前記押し上げ部は筒状であって前記現像装置のトナー補給口を構成し、その押し上げ部をその案内部に挿入することでシート部は押し上げられ、そのシート部の内部にトナー出口の開き時にトナーを導入するトナー導入口がシート部に形成され、そのシート部を介してトナー補給口にトナーが投入される請求項1に記載のトナー補給用治具。

【請求項3】 前記弁部材はトナー出口の周囲部に接離可能な本体部を有し、この本体部から前記シート部が延出し、その本体部とシート部に形成されるトナー導入口との間に軸方向の間隔が設けられ、その軸方向間ににおけるシート部の外周と前記案内部の内周との径方向間隔がトナーをシール可能な寸法とされる請求項2に記載のトナー補給用治具。

【請求項4】 トナー容器と、このトナー容器内に通じるトナー出口を開閉する弁部材とを備え、その弁部材をトナー出口の開き位置に押し上げる押し上げ部が現像装置に設けられるトナーカートリッジにおいて、前記トナー出口の周囲部から容器外部に向かい延出する筒状の案内部が設けられ、前記弁部材はこの案内部に挿入される筒状のシート部を有し、前記押し上げ部は筒状であって前記現像装置のトナー補給口を構成し、その押し上げ部をその案内部に挿入することでシート部は押し上げられ、そのシート部の内部にトナー出口の開き時にトナーを導入するトナー導入口がシート部に形成され、そのシート部を介してトナー補給口にトナーが投入されることを特徴とするトナーカートリッジ。

【請求項5】 前記弁部材はトナー出口の周囲部に接離可能な本体部を有し、この本体部から前記シート部が延出し、その本体部とシート部に形成されるトナー導入口との間に軸方向の間隔が設けられ、その軸方向間ににおけるシート部の外周と前記案内部の内周との径方向間隔が、トナーをシール可能な寸法とされる請求項4に記載のトナーカートリッジ。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、複写機等の現像装置にトナーを補給するためのトナー補給用治具およびトナーカートリッジに関する。

【0002】 【従来の技術】 電子写真用現像剤として使用するトナーはミクロン単位の有色微粉末であるため、現像装置のトナー貯留槽中にトナーを補給する際に空中への飛散や漏洩が生じると、複写機等の内外や作業者の皮膚や衣服等を汚染してしまう。このような問題を解決するため、使い捨てのできるトナーカートリッジが従来より用いられている。

【0003】 例えば、トナーを収容するカートリッジ本体のトナー出口をシール部材によりシールし、そのシール部材を現像装置への装着後に引き剥がすことでトナーを補給するトナーカートリッジや（特開昭59-93741号公報、特開平3-56479号公報参照）、現像装置のトナーカートリッジ装着部にトナー補給口の開閉機構を設け、そこに装着したトナーカートリッジの回転や移動によりトナー補給口を開いてトナーを補給するトナーカートリッジ（特開昭55-134875号公報、特開昭60-130772号公報、特開平2-56672号公報参照）が提案されている。また、図10の

（1）に示すように、トナー容器101に形成されたトナー出口102を開閉する弁部材103を備え、現像装置の補給口の中心に押し上げ部104を設け、そのトナー容器101を複写機等の案内面107に沿い下降させることで、図10の（2）に示すように、その押し上げ部104を弁部材103の中心孔103aに挿入し、トナー容器101内のバネ106の弾性力に抗し弁部材103をトナー出口102の開き位置に押し上げるトナーカートリッジが提案されている（特開昭60-80878号公報参照）。

【0004】 【発明が解決しようとする課題】 トナー出口をシールするシール部材を引き剥がすことでトナーを補給する従来のトナーカートリッジは、その引き剥がし動作が面倒なものであり、トナー飛散防止のため面倒な操作が必要になり、また、使用済のトナーカートリッジを取り外す際に残存したトナーが落ちこぼれる虞がある。

【0005】 トナーカートリッジの回転や移動によりトナーを補給する従来のトナーカートリッジは、現像装置のトナーカートリッジ装着部の構造が複雑して高価なものになり、そのトナーカートリッジの現像装置への装着後の回転や移動といった面倒な動作が必要であり、さらに、その回転や移動の際に現像装置のトナーカートリッジ装着部に付着していたトナーが落ちこぼれる虞がある。

【0006】 トナー出口102を開閉する弁部材103を備えた従来のトナーカートリッジは、製造コストが大きいことから使い捨てにするのは不経済なものである。また、押し上げ部104を現像装置の補給口105の中心に設ける必要があるため、その押し上げ部104の配置精度が悪いと弁部材103を完全に押し上げることが

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できずトナーの補給に支障をきたすと共に、現像装置の補給口の構造が複雑化する。また、一端が閉鎖されたトナー容器101の内部に弁部材103やバネ106等を取り付ける必要があるため組み立てが難しい。

【0007】本発明は、上記従来技術の問題を解決することのできるトナー補給用治具およびトナーカートリッジを提供することを目的とする。

【0008】

【課題を解決するための手段】本件第1発明は、現像装置にトナーを補給するためのトナー補給用治具であつて、トナー容器に着脱可能かつトナー容器の開口を被覆可能なカバーと、このカバーに形成されたトナー出口を開閉する弁部材とを備え、その弁部材をトナー出口の開き位置に押し上げる押し上げ部が前記現像装置に設けられることを特徴とする。前記トナー出口の周囲部からカバー外部に向かい延出する筒状の案内部が設けられ、前記弁部材はこの案内部に挿入される筒状のシート部を有し、前記押し上げ部は筒状であって前記現像装置のトナー補給口を構成し、その押し上げ部をその案内部に挿入することでシート部は押し上げられ、そのシート部の内部にトナー出口の開き時にトナーを導入するトナー導入口がシート部に形成され、そのシート部を介してトナー補給口にトナーが投入されるのが好ましい。前記弁部材はトナー出口の周囲部に接離可能な本体部を有し、この本体部から前記シート部が延出し、その本体部とシート部に形成されるトナー導入口との間に軸方向の間隔が設けられ、その軸方向間におけるシート部の外周と前記案内部の内周との径方向間隔がトナーをシール可能な寸法とされるのが好ましい。

【0009】本件第2発明は、トナー容器と、このトナー容器内に通じるトナー出口を開閉する弁部材とを備え、その弁部材をトナー出口の開き位置に押し上げる押し上げ部が現像装置に設けられるトナーカートリッジにおいて、前記トナー出口の周囲部から容器外部に向かい延出する筒状の案内部が設けられ、前記弁部材はこの案内部に挿入される筒状のシート部を有し、前記押し上げ部は筒状であって前記現像装置のトナー補給口を構成し、その押し上げ部をその案内部に挿入することでシート部は押し上げられ、そのシート部の内部にトナー出口の開き時にトナーを導入するトナー導入口がシート部に形成され、そのシート部を介してトナー補給口にトナーが投入されることを特徴とする。前記弁部材はトナー出口の周囲部に接離可能な本体部を有し、この本体部から前記シート部が延出し、その本体部とシート部に形成されるトナー導入口との間に軸方向の間隔が設けられ、その軸方向間におけるシート部の外周と前記案内部の内周との径方向間隔が、トナーをシール可能な寸法とされるのが好ましい。

【0010】

【作用】本発明のトナー補給用治具およびトナーカート

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リッジによれば、トナー出口を閉鎖する弁部材を現像装置の押し上げ部材により押し上げるだけでトナー出口を開いて現像装置にトナーを補給することができるので、煩雑な補給動作は不要になる。また、現像装置から取り外す際に弁部材によりトナー出口を閉鎖すると、残存したトナーが落ちこぼれるのを防止できる。また、筒状の案内部に現像装置のトナー補給口を構成する筒状の押し上げ部を挿入することで、弁部材のシート部を押し上げ、トナーをトナー出口からトナー導入口を通りシート部の内部に導入し、そのシート部からトナー補給口に投入することができる。すなわち、弁部材を押し上げ部により確実に押し上げてトナーをトナー補給口に投入することができ、しかも、その押し上げ部がトナー補給口を構成するので、弁部材を押し上げる専用の部材を現像装置に設ける必要がなくトナー補給口の構造が複雑化することはない。その弁部材の本体部とシート部に形成されるトナー導入口との軸方向間においてトナーがシール可能とされることで、その軸方向間隔だけ弁部材が押し上げられない限りトナーが排出されることはなく、トナーの漏れを確実に防止できる。

【0011】本発明のトナー補給用治具はトナー容器に対し着脱可能なので、トナー容器は使い捨てされるものであっても新しいトナー容器に対し再利用でき、経済的なものである。また、カバーと弁部材との組み立ては、カバーをトナー容器から取り外した状態で行なえるので容易に行なえる。

【0012】

【実施例】以下、図面を参照して本発明の実施例を説明する。

【0013】図4に示すトナーカートリッジ1は、トナー容器2とトナー補給用治具3とから構成されている。そのトナー容器2は筒状であって、図1の(1)に示すように、その上部が環状の治具接続部2aに囲まれた開口4とされ、この開口4は治具接続部2aに引き剥がしが可能に張り付けられたシール部材5によりシールされる。

【0014】図2にも示すように、そのトナー補給用治具3は、トナー容器2の開口4を覆うカバー10と、このカバー10に形成されたトナー出口11を開閉する弁部材12とを備える。そのカバー10は筒状であって、その径方向寸法は一端から他端に向かうに従い次第に小さくなり、その一端内周が前記トナー容器2の治具接続部2aの外周に着脱可能に嵌合され、その他端の開口がトナー出口11とされている。そのカバー10と治具接続部2aとはネジを介し嵌合してもよい。そのトナー出口11の周囲部からカバー外部に向かい延出する円筒状の案内部15が設けられ、この案内部15の先端はキャップ26により閉鎖される。

【0015】図3にも示すように、その弁部材12は、中空半球形状の本体部16と、この本体部16の端面か

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ら延出する円筒状のシート部17とを有する。その本体部16は、端面の外周縁がトナー出口11よりも大径とされ、そのシート部17は前記案内部15に軸方向に移動可能に挿入され、これにより、その本体部16の外周縁はカバー10内においてトナー出口11の周囲部に接離可能とされている。そのカバー10の内部に取り付けられた一対のフック30にバネ31が掛けられ、そのバネ31の弾性力により本体部16の外周縁はトナー出口11の周囲部に押し付けられ、これによりトナー出口11は閉鎖される。そのシート部17の外周と案内部15の内周との径方向間隔は、トナーをシール可能な寸法とされる。

【0016】その弁部材12をトナー出口11の開き位置に押し上げる押し上げ部20が現像装置に設けられる。すなわち、図1の(2)に示すように、その押し上げ部20は円筒状であって、その現像装置のトナー補給口21を構成し、図1の(3)に示すように、その押し上げ部20を前記案内部15に挿入することでシート部17はバネ31の弾性力に抗し押し上げられ、この押し上げにより本体部16の外周縁とトナー出口11の周囲部とが離れてトナー出口11は開かれる。その押し上げ部20の外周と案内部15の内周との径方向間隔は、トナーをシール可能な寸法とされる。そのトナー出口11の開き時に、トナー容器2に収容されたトナー19をシート部17の内部に導入することができるよう、そのシート部17にトナー導入口18が形成されている。

【0017】上記構成により現像装置にトナー19を補給するには、まず、トナー容器2の開口4を閉鎖するシール部材5を引き剥がし、次に、トナー容器2の治具接続部2aにトナー補給用治具3のカバー10を嵌合し、これによりトナーカートリッジ1を構成する。次に、トナー補給用治具3の案内部15の先端を閉鎖するキャップ26を取り外し、その案内部15に現像装置のトナー補給口21を構成する押し上げ部20を挿入することで、弁部材12のシート部17を押し上げ、トナー19をトナー出口11からトナー導入口18を通りシート部17の内部に導入し、そのシート部17からトナー補給口21に投入する。

【0018】すなわち、トナー出口11を閉鎖する弁部材12を現像装置の押し上げ部20により押し上げるだけでトナー出口11を開いて現像装置にトナーを補給することができるので、煩雑な補給動作は不要になる。また、その弁部材12を押し上げ部20により確実に押し上げてトナーをトナー補給口21に投入することができ、しかも、その押し上げ部20がトナー補給口21を構成するので、弁部材12を押し上げる専用の部材を現像装置に設ける必要がなくトナー補給口21の構造が複雑化することはない。また、現像装置からトナーカートリッジ1を取り外すと、弁部材12はバネ30の弾性力

により移動してトナー出口11を閉鎖するので、トナーがこぼれ落ちることはない。

【0019】上記構成のトナー補給用治具3はトナー容器2に対し着脱可能なので、トナー容器2が使い捨てられても新たなトナー容器に対し再利用でき経済的なものである。また、カバー10と弁部材12、フック30、バネ31との組み立ては、カバー10をトナー容器2から取り外した状態で行なえるので容易に行なえる。

【0020】図5、図6は本発明の第1変形例を示す。10 上記実施例との相違は、弁部材12の本体部16とシート部17に形成されるトナー導入口18との間に軸方向の間隔Dが設けられ、その軸方向間におけるシート部17の外周と案内部15の内周との径方向間隔が、トナー19をシール可能な寸法とされている点にある。他は上記実施例と同様の構成とされている。これにより、その軸方向間隔Dだけ弁部材12が押し上げられない限りトナー19が排出されることなく、トナー19の漏れを確実に防止できる。

【0021】図7は本発明の第2変形例を示す。上記実20 施例との相違は、トナー出口11の周囲部に環状の凹部40が形成され、この凹部40に弁部材12の本体部16の外周縁が嵌合されることでトナー出口11が閉鎖される。また、カバー10は弾性を有する合成樹脂等の材質により構成され、押し上げ部20によりシート部17が押し上げられると、その凹部40の周囲が変形することで本体部16は凹部40から外れ、トナー出口11は開かれる。なお、押し上げられた弁部材12はトナーカートリッジ1の取り外しの際には重力により下降するので、弁部材12を押すバネ31は設けられていない。30 他は上記実施例と同様の構成とされている。

【0022】図8は本発明の第3変形例を示す。上記実40 施例との相違は、トナー出口11の周囲部と弁部材12の本体部16とに環状体50、51が取り付けられた点にある。両環状体50、51は、少なくとも一方が永久磁石であり、他方は永久磁石であってもよいし磁力に引き寄せられる無機物質であっても良く、例えば、一方を環状のプラスチック磁石とし、他方をマグネタイト、フェライト粉、鉄粉等の磁性粉が分散された環状プラスチックとする。両環状体50、51が互いに吸着することでトナー出口11が閉鎖され、押し上げ部20によりシート部17が押し上げられると、両環状体50、51が互いに離反し、トナー出口11は開かれる。なお、押し上げられた弁部材12は重力と磁力により下降するので、弁部材12を押すバネ31は設けられていない。他は上記実施例と同様の構成とされている。

【0023】図9は本発明の第4変形例を示す。上記実50 施例との相違は、カバー10の径方向寸法が、上記実施例では一端から他端に向かうに従い次第に小さくなるのに対し、この変形例では両端間で径方向寸法が最大とされ、両端に向かうに従い次第に小さくなるものとされ、

両端開口の径方向寸法は等しくされている。他は上記実施例と同様の構成とされている。これにより、カバー10の両端開口の何れもトナー出口11として使用することができる。

【0024】なお、本発明は上記実施例や変形例に限定されない。例えば、案内部、シート部、押し上げ部は角筒状であってもよい。

【0025】

【発明の効果】本発明のトナー補給用治具とトナーカートリッジによれば、現像装置にトナーを確実に投入でき、現像装置の補給口の構造を簡単化でき、トナーの漏れを無くすことができ、さらに、トナー補給用治具は再利用でき経済的であって組み立てが容易なものである。

【図面の簡単な説明】

【図1】本発明の実施例のトナーカートリッジの作用説明用断面図

【図2】本発明の実施例のトナー補給用治具の断面図

【図3】本発明の実施例のトナー補給用治具の弁部材の斜視図

【図4】本発明の実施例のトナーカートリッジの斜視図

【図5】本発明の第1変形例のトナー補給用治具の弁部材の斜視図

【図6】本発明の第1変形例のトナーカートリッジの作\*

#### \*用説明用断面図

【図7】(1)は本発明の第2変形例のトナー補給用治具の断面図、(2)は(1)の部分拡大図

【図8】(1)は本発明の第3変形例のトナー補給用治具の断面図、(2)は(1)の部分拡大図

【図9】本発明の第4変形例のトナー補給用治具の断面図

【図10】本発明の従来例のトナーカートリッジの作用説明用断面図

#### 10 【符号の説明】

1 トナーカートリッジ

2 トナー容器

3 トナー補給用治具

10 カバー

11 トナー出口

12 弁部材

15 案内部

16 本体部

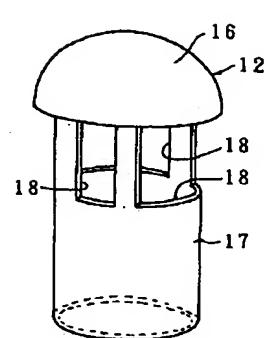
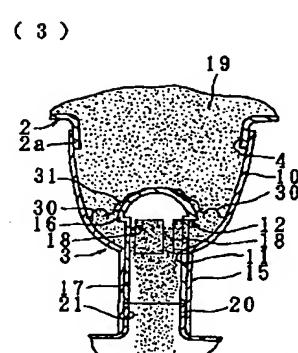
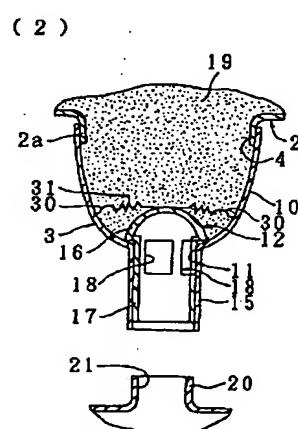
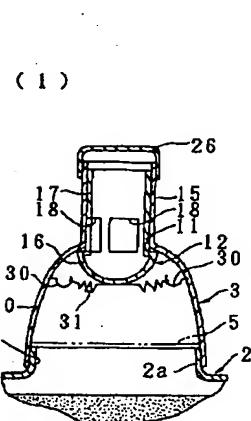
17 シート部

18 トナー導入口

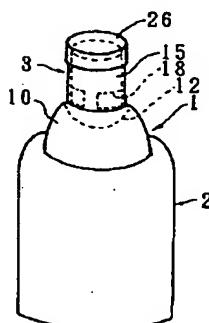
19 トナー

20 押し上げ部

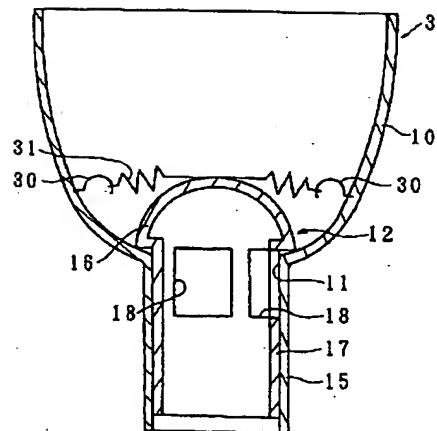
21 トナー補給口



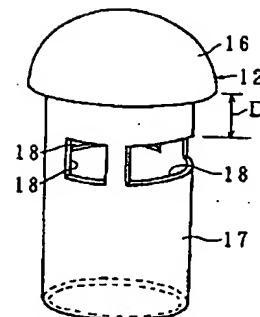
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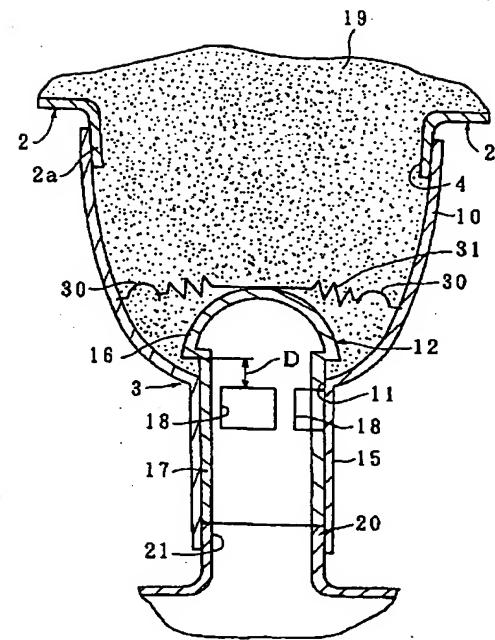
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【図5】

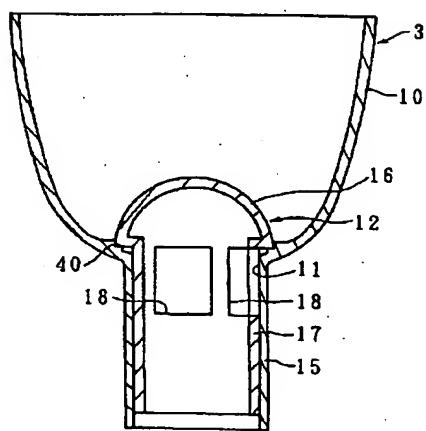


【図6】

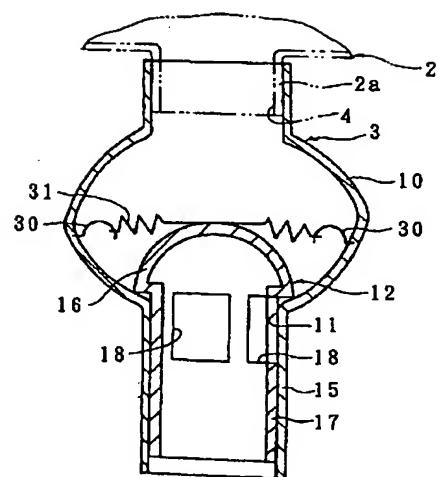


【図7】

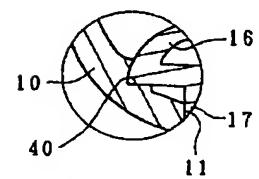
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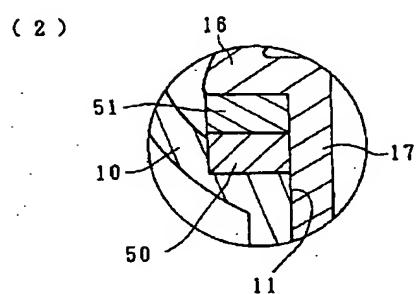
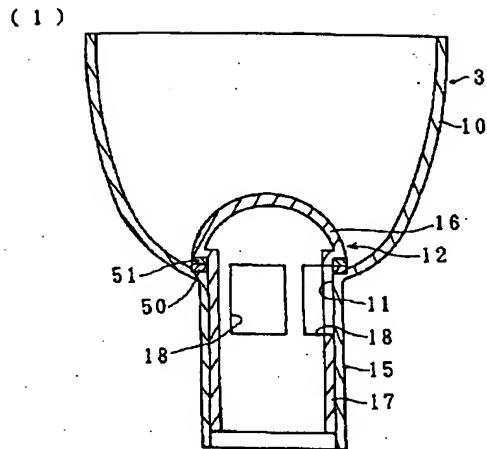
【図9】



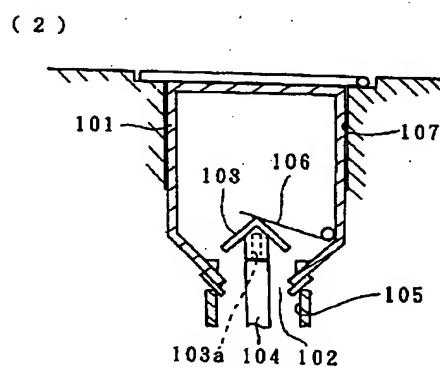
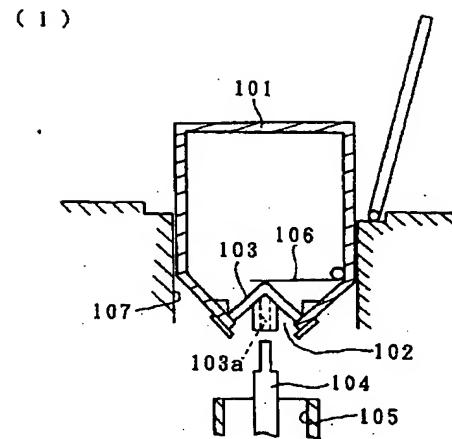
(2)



【図8】



【図10】



Japanese Laid-open Patent

Laid-open Number: Hei 7-44005

Laid-open Date: February 14, 1995

Application Number: Hei 5-208321

Filing Date: July 31, 1993

Applicant: Kao Corporation

[Title of the Invention] Toner replenishing jig and toner cartridge

[Summary]

[Constitution] The present invention is provided with a valve member 12 for opening and closing a toner outlet 11 formed in a cover 10 that is detachably attachable to a toner container 2. A lifting portion 20 for lifting up the valve member 12 to a position for opening the toner outlet 11 is provided to a developing device.

[Effect] The present invention is capable of reliably charging toner into the developing device, simplifying the structure of a replenishing port of the developing device, and eliminating toner leakage, and allows its reuse and thus proves economical while enabling easy assembly.

[Scope of Claims]

[Claim 1] A toner replenishing jig for replenishing toner to a developing device, comprising: a cover that is detachably attachable to a toner container and capable of covering an opening of the toner container; and a valve member for opening and closing a toner outlet formed in the cover, characterized in that the developing device is provided with a lifting position for lifting up the valve member to a position for opening the toner outlet.

[Claim 2] A toner replenishing jig according to Claim 1, wherein: the toner replenishing jig is provided with a tubular guide portion extending from a surrounding portion of the toner outlet toward an outside of the cover; the valve member has a tubular chute portion that is inserted into the guide portion, and the lifting portion has a tubular configuration and constitutes a toner replenishing port of the developing device, the chute portion being lifted up by inserting the lifting portion into the guide portion; and the chute portion is provided with a toner introduction port through which toner is introduced into the chute portion when the toner outlet is open, the toner being charged into the toner replenishing port through the chute portion.

[Claim 3] A toner replenishing jig according to Claim 2, wherein: the valve member has a main body portion capable of coming into and out of contact with the surrounding portion of the toner outlet, the chute portion extending from the main body position; and an axial distance is provided between the main body portion and the toner introduction port that is formed in the chute portion, and within the axial distance, a radial distance between an outer periphery of the chute portion and an inner periphery of the guide portion is set to a size allowing sealing of toner.

[Claim 4] A toner cartridge comprising: a toner container; and a valve member for opening and closing a toner outlet that communicates with an interior of the toner container, in which a lifting portion for lifting up the valve member to a position for opening the toner outlet is provided to a developing device, characterized in that: the toner cartridge is provided with a tubular guide portion extending from a surrounding portion of the toner outlet toward an outside of the container; the valve member has a tubular chute portion that is inserted into the guide portion, and the lifting portion has a tubular configuration and constitutes a toner replenishing port of the developing device, the chute portion being lifted up by inserting the lifting portion into the guide portion; and the chute portion is provided with a toner introduction port through which toner is introduced into the chute portion when the toner outlet is open, the toner being charged into the toner replenishing port through the chute portion.

[Claim 5] A toner cartridge according to Claim 4, wherein: the valve member has a main body portion capable of coming into and out of contact with the surrounding portion of the toner outlet, the chute portion extending from the main body position; and an axial distance is provided between the main body portion and the toner introduction port that is formed in the chute portion, and within the axial distance, a radial distance between an outer periphery of the chute portion and an inner periphery of the guide portion is set to a size allowing sealing of toner.

[Detailed Description of the Invention]

[0001]

[Field of Industrial Application] The present invention relates to a toner replenishing jig and a toner cartridge which are used for replenishing

toner to a developing device of a copying machine or the like.

[0002]

[Prior Art] Toner used as electrophotographic developer is fine, colored micron-order powder; when the toner scatters or leaks to the air at the time of replenishing the toner into a toner retaining vessel of a developing device, the toner contaminates the interior and exterior of a copying machine, the skin or cloth of the operator, and the like. To overcome this problem, a disposable toner cartridge has conventionally been used.

[0003] For example, there have been proposed: a toner cartridge in which a toner outlet of a cartridge main body accommodating toner is sealed with a sealing member, the sealing member being peeled off after mounting the toner cartridge to a developing device to thereby allow toner replenishment (see JP 59-93741 A, JP 3-56479 A); and a toner cartridge in which a mechanism for opening and closing a toner replenishing port is provided to a toner cartridge mounting portion of a developing device, the toner replenishing port being opened through rotation or movement of the toner cartridge mounted thereto to thereby allow toner replenishment (see JP 55-134875 A, JP 60-130772 A, JP 2-56672 A). Further, as shown in (1) of Fig. 10, there has been proposed a toner cartridge equipped with a valve member 103 for opening and closing a toner outlet 102 formed in a toner container 101, with a lifting portion 104 being provided at the center of a replenishing port in a developing device; by lowering the toner container 101 along a guide surface 107 of a copying machine or the like, as shown in (2) of Fig. 10, the lifting portion 104 is inserted into a central hole 103a of the valve member 103, thereby lifting the valve member 103 to a position for opening the toner outlet 102 against the elastic force of a spring 106 inside the toner container 101 (see JP 60-80878 A).

[0004]

[Problems to be solved by the Invention] With the conventional toner cartridge, in which the sealing member sealing the toner outlet is peeled off to thereby allow toner replenishment, the operation of peeling off the sealing member is cumbersome, a rather complicated operation is required for preventing scattering of toner, and remaining toner may spill out at the time of detaching the toner cartridge after use.

[0005] With the conventional toner cartridge which effects toner replenishment through rotation or movement of the toner cartridge, the toner cartridge mounting portion of the developing device becomes complex in structure, which drives up the cost of the toner cartridge, and the cumbersome operation of rotating or moving the toner cartridge after its mounting to the developing device is required; furthermore, toner adhering to the toner cartridge mounting portion of the developing device may spill out as the toner cartridge is rotated or moved.

[0006] Due to its high manufacturing cost, the conventional toner cartridge equipped with the valve member 103 for opening and closing the toner outlet 102 proves rather uneconomical for disposable use. Further, since the lifting portion 104 must be provided at the center of the replenishing port 105 of the developing device, the valve member 103 cannot be fully lifted up if the arrangement accuracy of the lifting portion 104 is poor, which hinders toner replenishment, and also the replenishing port of the developing device becomes complex in structure. Further, the assembly is rather difficult because it is necessary to attach the valve member 103, the spring 106, and the like to the interior of the toner container 101

that is closed at one end.

[0007] It is an object of the present invention to provide a toner replenishing jig and a toner cartridge that are capable of solving the problems of the prior art described above.

[0008]

[Means for solving the Problems] According to a first aspect of the present invention, there is provided a toner replenishing jig for replenishing toner to a developing device, including: a cover that is detachably attachable to a toner container and capable of covering an opening of the toner container; and a valve member for opening and closing a toner outlet formed in the cover, characterized in that the developing device is provided with a lifting position for lifting up the valve member to a position for opening the toner outlet. It is preferable that: the toner replenishing jig be provided with a tubular guide portion extending from a surrounding portion of the toner outlet toward an outside of the cover; the valve member have a tubular chute portion that is inserted into the guide portion, and the lifting portion have a tubular configuration and constitute a toner replenishing port of the developing device, the chute portion being lifted up by inserting the lifting portion into the guide portion; and the chute portion be provided with a toner introduction port through which toner is introduced into the chute portion when the toner outlet is open, the toner being charged into the toner replenishing port through the chute portion. It is preferable that: the valve member have a main body portion capable of coming into and out of contact with the surrounding portion of the toner outlet, the chute portion extending from the main body position; and an axial distance be provided between the main body portion and the toner introduction port that is formed in the chute portion, and within the axial distance, a radial distance between an outer periphery of the chute portion and an inner periphery of the guide portion be set to a size allowing sealing of toner.

[0009] According to a second aspect of the present invention, there is provided a toner cartridge including: a toner container; and a valve member for opening and closing a toner outlet that communicates with an interior of the toner container, in which a lifting portion for lifting up the valve member to a position for opening the toner outlet is provided to a developing device, characterized in that: the toner cartridge is provided with a tubular guide portion extending from a surrounding portion of the toner outlet toward an outside of the container; the valve member has a tubular chute portion that is inserted into the guide portion, and the lifting portion has a tubular configuration and constitutes a toner replenishing port of the developing device, the chute portion being lifted up by inserting the lifting portion into the guide portion; and the chute portion is provided with a toner introduction port through which toner is introduced into the chute portion when the toner outlet is open, the toner being charged into the toner replenishing port through the chute portion. It is preferable that: the valve member have a main body portion capable of coming into and out of contact with the surrounding portion of the toner outlet, the chute portion extending from the main body portion; and an axial distance be provided between the main body portion and the toner introduction port that is formed in the chute portion, and within the axial distance, a radial distance between an outer periphery of the chute portion and an inner periphery of the guide portion be set to a size allowing sealing of toner.

[0010]

[Operation] According to the toner replenishing jig and the toner cartridge of the present invention, toner replenishment to the developing device can be performed by simply lifting up the valve member closing the toner outlet by the lifting portion of the developing device to open the toner outlet, whereby no cumbersome replenishing operation is necessary. Further, the toner outlet is closed by the valve member upon detachment of the toner replenishing jig or the toner cartridge from the developing device, thereby making it possible to prevent remaining toner from spilling out. Further, the chute portion of the valve member is lifted up by inserting the tubular lifting portion, which constitutes the toner replenishing port of the developing device, into the tubular guide portion, whereby toner can be introduced from the toner outlet into the chute portion by way of the toner introduction port, thereafter toner being charged into the toner replenishing port from the chute portion. That is, toner can be charged into the toner replenishing port by reliably lifting up the valve member by the lifting portion. Moreover, since the lifting portion constitutes the toner replenishing port, there is no need to provide the developing device with a dedicated member for lifting up the valve member, and the structure of the toner replenishing port does not become complex. Toner sealing can be effected within the axial distance between the main body portion of the valve member and the toner introduction port formed in the chute portion, whereby toner is not discharged unless the valve member is lifted up by the distance corresponding to the axial distance, and toner leakage can be prevented with reliability.

[0011] Since the toner replenishing jig of the present invention is detachably attachable to the toner container, even when the toner container used is a disposable one, the toner replenishing jig can be reused for a new toner container and thus proves economical. Further, the assembly of the cover and the valve member with respect to each other is easy because it can be performed with the cover detached from the toner container.

[0012]

[Embodiment] Hereinbelow, an embodiment of the present invention is described with reference to the drawings.

[0013] A toner cartridge 1 shown in Fig. 4 is composed of a toner container 2 and a toner replenishing jig 3. The toner container 2 is tubular in configuration, and as shown in (1) of Fig. 1, its top portion is formed as an opening 4 that is surrounded by an annular jig connecting portion 2a, the opening 4 being sealed with a sealing member 5 peelably attached to the jig connecting portion 2a.

[0014] As shown in Fig. 2, the toner replenishing jig 3 is equipped with a cover 10 covering the opening 4 of the toner container 2, and a valve member 12 for opening and closing a toner outlet 11 formed in the cover 10. The cover 10 is of a tubular configuration whose radial size gradually decreases from one end to the other end thereof; the inner periphery of the cover 10 at its one end is detachably fitted onto the outer periphery of the jig connecting portion 2a of the toner container 2, with the opening at the other end of the cover 10 serving as the toner outlet 11. The cover 10 and the jig connecting portion 2a may be fitted with each other through the intermediation of a screw. There is provided a cylindrical guide portion 15 extending from the surrounding portion of the toner outlet 11 toward the outside of the cover, with the distal end of the guide portion 15 being closed by a cap 26.

[0015] As shown in Fig. 3, the valve member 12 has a hollow, semi-spherical main body portion 16 and a cylindrical chute portion 17 extending from an end face of the main body portion 16. The outer peripheral edge at the end face of the main body portion 16 is formed larger than the toner outlet 11, and the chute portion 17 is inserted into the guide portion 15 so as to be axially movable, whereby the outer peripheral edge of the main body portion 16 can be brought into and out of contact with the surrounding portion of the toner outlet 11. A spring 31 is tensioned between a pair of hooks 30 attached to the interior of the cover 10. The elastic force of the spring 31 causes the outer peripheral edge of the main body portion 16 to be pressed against the surrounding portion of the toner outlet 11, whereby the toner outlet 11 is closed. The radial distance between the outer periphery of the chute portion 17 and the inner periphery of the guide portion 15 is set to a size allowing sealing of toner.

[0016] The developing device is provided with a lifting portion 20 for lifting the valve member 12 to the position for opening the toner outlet 11. That is, as shown in (2) of Fig. 1, the lifting portion 20 has a cylindrical configuration and constitutes a toner replenishing port 21 of the developing device. As shown in (3) of Fig. 1, by inserting the lifting portion 20 into the guide portion 15, the chute portion 17 is lifted up against the elastic force of the spring 31. This lifting action brings the outer peripheral edge of the main body portion 16 and the surrounding portion of the toner outlet 11 away from each other, thereby opening the toner outlet 11. The radial distance between the outer periphery of the lifting portion 20 and the inner periphery of the guide portion 15 is set to a size allowing sealing of toner. The chute portion 17 is provided with a toner introduction port 18 so that toner 19 accommodated in the toner container 2 can be introduced into the interior of the chute portion 17, when the toner outlet 11 is open.

[0017] To replenish the toner 19 to the developing device by means of the construction described above, first, the sealing member 5 closing the opening 4 of the toner container 2 is peeled off. Then, the cover 10 of the toner replenishing jig 3 is fitted onto the jig connecting portion 2a of the toner container 2, thus forming the toner cartridge 1. Subsequently, the cap 26 closing the distal end of the guide portion 15 of the toner replenishing jig 3 is detached, and the lifting portion 20, which constitutes the toner replenishing port 21 of the developing device, is inserted into the guide portion 15, thereby lifting up the chute portion 17 of the valve member 12, whereby the toner 19 is introduced from the toner outlet 11 into the chute portion 17 by way of the toner introduction port 18, before being charged into the toner replenishing port 21 from the chute portion 17.

[0018] That is, toner can be replenished to the developing device by opening the toner outlet 11 through the simple operation of lifting up the valve member 12 closing the toner outlet 11 by means of the lifting portion 20 of the developing device, whereby no complicated replenishing operation is required. Further, the valve member 12 can be reliably lifted up by the lifting portion 20 to charge toner into the toner replenishing port 21. Moreover, the lifting portion 20 constitutes the toner replenishing port 21, whereby there is no need to provide the developing device with a dedicated member for lifting up the valve member 12, and the structure of the toner replenishing port 21 does not become complex. Further, upon detaching the toner cartridge 1 from the developing device, the valve

member 12 is moved by the elastic force of the spring 30 so as to close the toner outlet 11, whereby there is no fear of toner spilling out.

[0019] Since the toner replenishing jig 3 constructed as described above is detachably attachable to the toner container 2, even when the toner container 2 that has been used is disposed of, the toner replenishing jig 3 can be reused for a new toner container and thus proves economical. Further, the assembly of the cover 10 and the valve member 12, and the hooks 30 and the spring 31 is easy because it can be performed with the cover 10 detached from the toner container 2.

[0020] Figs. 5, 6 show a first modification of the present invention. The difference from the embodiment described above resides in that an axial distance D is provided between the main body portion 16 of the valve member 12 and the toner introduction port 18 formed in the chute portion 17, and that within the axial distance, the radial distance between the outer periphery of the chute portion 17 and the inner periphery of the guide portion 15 is set to a size allowing sealing of the toner 19. Otherwise, the first modification is of the same construction as the above-described embodiment. As a result, there is no discharge of the toner 19 unless the valve member 12 is lifted up by the axial distance D, thereby making it possible to prevent leakage of the toner 19 with reliability.

[0021] Fig. 7 shows a second modification of the present invention. The difference from the above-described embodiment resides in the formation of an annular recess 40 around the surrounding portion of the toner outlet 11 so that the toner outlet 11 is closed as the outer peripheral edge of the main body portion 16 of the valve member 12 is fitted into the recess 40. Further, the cover 10 is formed of an elastic material such as a synthetic resin; as the chute portion 17 is lifted up by the lifting portion 20, the surrounding portion of the recess 40 undergoes deformation, causing the main body portion 16 to dislodge from the recess 40 to thereby open the toner outlet 11. It should be noted that since the valve member 12 that has been lifted up is lowered by gravity upon detaching the toner cartridge 1, there is provided no spring 31 for pushing the valve member 12. Otherwise, the second modification is of the same construction as the above-described embodiment.

[0022] Fig. 8 shows a third modification of the present invention. The difference from the above-described embodiment resides in the attachment of annular members 50, 51 to the surrounding portion of the toner outlet 11 and the main body portion 16 of the valve member 12. Of the two annular members 50, 51, at least one is a permanent magnet and the other may be a permanent magnet or an inorganic substance that is attracted by magnetic force; for example, one of them is an annular plastic magnet, with the other being an annular plastic body in which magnetic powder such as magnetite, ferrite powder, or iron powder is dispersed. The toner outlet 11 is closed as the two annular members 50, 51 adsorb each other, and when the chute portion 17 is lifted up by the lifting portion 20, the two annular members 50, 51 are separated from each other, whereby the toner outlet 11 is opened. It should be noted that since the valve member 12 that has been lifted up is lowered by gravity and magnetic force, there is provided no spring 31 for pushing the valve member 12. Otherwise, the third modification is of the same construction as the above-described embodiment.

[0023] Fig. 9 shows a fourth modification of the present invention. The difference from the above-described embodiment resides in the following

construction. That is, while in the above-described embodiment the radial dimension of the cover 10 gradually decreases from one end to the other end thereof, according to this modification, the radial dimension becomes maximum at the intermediate portion between the two ends and gradually decreases toward the either end, with the radial dimensions of the opposite end openings being equal to each other. Otherwise, the fourth modification is of the same construction as the above-described embodiment. As a result, each of the opposite end openings of the cover 10 can be used as the toner outlet 11.

[0024] It should be noted that the present invention is not limited to the above-described embodiment and modifications. For example, the guide portion, the chute portion, and the lifting portion may have a rectangular tube-like configuration.

[0025]

[Effect of the Invention] According to the toner replenishing jig and the toner cartridge of the present invention, toner can be reliably charged into the developing device, the replenishing port of the developing device can be simplified in structure, and toner leakage can be eliminated. Moreover, the toner replenishing jig is reusable and thus proves economical while allowing easy assembly.

[Brief Description of the Drawings]

[Fig. 1] Sectional views illustrating operation of a toner cartridge according to an embodiment of the present invention.

[Fig. 2] A sectional view of a toner replenishing jig according to the embodiment of the present invention.

[Fig. 3] A perspective view showing a valve member of the toner replenishing jig according to the embodiment of the present invention.

[Fig. 4] A perspective view of a toner cartridge according to the embodiment of the present invention.

[Fig. 5] A perspective view showing a valve member of a toner replenishing jig according to a first modification of the present invention.

[Fig. 6] A sectional view illustrating operation of a toner cartridge according to the first modification of the present invention.

[Fig. 7] (1) A sectional view of a toner replenishing jig according to a second modification of the present invention; and (2) a partial enlarged view of (1).

[Fig. 8] (1) A sectional view of a toner replenishing jig according to a third modification of the present invention; and (2) a partial enlarged view of (1).

[Fig. 9] A sectional view of a toner replenishing jig according to a fourth modification of the present invention.

[Fig. 10] Sectional views illustrating operation of a conventional toner cartridge.

[Description of Reference Numerals]

- 1 toner cartridge
- 2 toner container
- 3 toner replenishing jig
- 10 cover
- 11 toner outlet
- 12 valve member
- 13 guide portion
- 16 main body portion
- 17 chute portion

18 toner introduction port  
19 toner  
20 lifting portion  
21 toner replenishing port